

What is claimed is:

1. A local area augmentation navigation system for determining the location of an object using differential GPS, the system comprising:

at least two reference stations at known locations, each of the reference stations receiving a GPS signal from a GPS constellation and collecting and outputting the pseudo-range data from the GPS signal;

a master station receiving the pseudo-range data from the reference stations, the master station forming a correction message from the pseudo-range data and the known locations of the reference stations, the master station broadcasting the correction message;

a security receiver monitoring the broadcast by the master station and other broadcasts in the area; and

a LAAS receiver receiving the correction message broadcast by the master station as well as a GPS signal from the GPS constellation and calculating the location of the LAAS receiver with the correction message and the GPS signal.

2. The local area augmentation navigation system of claim 1, wherein the master

station includes a VHF transmitter and broadcasts the correction message with the VHF transmitter.

3. The local area augmentation navigation system of claim 1, wherein the known locations of the reference stations are precisely surveyed locations.
4. The local area augmentation navigation system of claim 1, wherein each of the reference stations includes an independent power supply.
5. The local area augmentation navigation system of claim 4, wherein the independent power supply is a solar power supply.
6. The local area augmentation navigation system of claim 1, wherein the local area augmentation navigation system does not require any significant power or communication infrastructure.
7. The local area augmentation navigation system of claim 1, wherein the

correction message is broadcast as an omni directional data broadcast.

8. The local area augmentation navigation system of claim 1, wherein the correction message is broadcast as a directional data broadcast.
9. The local area augmentation navigation system of claim 1, wherein the object is an airplane, and wherein the correction message includes differential pseudo-range corrections and data describing the final approach paths that are available to the pilot.
10. The local area augmentation navigation system of claim 1, further comprising an evaluation computer receiving an information signal from the security receiver and outputting an alert signal when a message is received by the security receiver which is indicative of an unauthorized broadcaster.
11. The local area augmentation system of claim 10, wherein the evaluation computer receives the correction message output by the master station and determines that an unauthorized broadcaster exists when the message

received by the security receiver does not match the correction message broadcast by the master station.

12. The local area augmentation system of claim 10, wherein the evaluation computer is implemented in the security receiver.
13. The local area augmentation system of claim 10, wherein the evaluation computer is implemented in the master station.
14. The local area augmentation system of claim 10, wherein the evaluation computer is implemented in an air traffic control computer.
15. The local area augmentation system of claim 1, wherein the reference stations communicate with the master station via wireless transceivers.
16. The local area augmentation system of claim 1, wherein the communication between the reference stations and the master station is encoded.

17. A local area augmentation navigation system for determining the location of an object using differential GPS, the system comprising:

at least two reference stations at known locations, each of the reference stations receiving a GPS signal from a GPS constellation and collecting and outputting the pseudo-range data from the GPS signal;

a master station receiving the pseudo-range data from the reference stations, the master station forming a correction message from the pseudo-range data and the known locations of the reference stations, the master station broadcasting the correction message;

a security receiver having an antenna separate from the master station for monitoring the broadcast by the master station and other broadcasts in the area; and

a LAAS receiver receiving the correction message broadcast by the master station as well as a GPS signal from the GPS constellation and calculating the location of the LAAS receiver with the correction message and the GPS signal.

18. The local area augmentation navigation system of claim 17, wherein the

master station includes a VHF transmitter and broadcasts the correction message with the VHF transmitter.

19. The local area augmentation navigation system of claim 17, wherein the known locations of the reference stations are precisely surveyed locations.
20. The local area augmentation navigation system of claim 17, wherein each of the reference stations includes an independent power supply.
21. The local area augmentation navigation system of claim 20, wherein the independent power supply is a solar power supply.
22. The local area augmentation navigation system of claim 17, wherein the local area augmentation navigation system does not require any significant power or communication infrastructure.
23. The local area augmentation navigation system of claim 17, wherein the

correction message is broadcast as an omni directional data broadcast.

24. The local area augmentation navigation system of claim 17, wherein the correction message is broadcast as a directional data broadcast.
25. The local area augmentation navigation system of claim 17, wherein the object is an airplane, and wherein the correction message includes differential pseudo-range corrections and data describing the final approach paths that are available to the pilot.
26. The local area augmentation navigation system of claim 17, further comprising an evaluation computer receiving an information signal from the security receiver and outputting an alert signal when a message is received by the security receiver which is indicative of an unauthorized broadcaster.
27. The local area augmentation system of claim 26, wherein the evaluation computer receives the correction message output by the master station and determines that an unauthorized broadcaster exists when the message

received by the security receiver does not match the correction message broadcast by the master station.

28. The local area augmentation system of claim 26, wherein the evaluation computer is implemented in the security receiver.
29. The local area augmentation system of claim 26, wherein the evaluation computer is implemented in the master station.
30. The local area augmentation system of claim 26, wherein the evaluation computer is implemented in an air traffic control computer.
31. The local area augmentation system of claim 17, wherein the reference stations communicate with the master station via wireless transceivers.
32. The local area augmentation system of claim 17, wherein the communication between the reference stations and the master station is encoded.



33. A local area augmentation navigation system for determining the location of an object using differential GPS, the system comprising:

at least two reference stations at known locations, each of the reference stations receiving a GPS signal from a GPS constellation and collecting and outputting the pseudo-range data from the GPS signal;

a master station receiving the pseudo-range data from the reference stations, the master station forming a correction message from the pseudo-range data and the known locations of the reference stations, the master station broadcasting the correction message;

a security receiver positioned remotely from the master station for monitoring unauthorized broadcasts in the area having a similar character as the correction message broadcast by the master station; and

a LAAS receiver receiving the correction message broadcast by the master station as well as a GPS signal from the GPS constellation and calculating the location of the LAAS receiver with the correction message and the GPS signal.

34. The local area augmentation navigation system of claim 33, wherein the master station includes a VHF transmitter and broadcasts the correction message with the VHF transmitter.

35. The local area augmentation navigation system of claim 33, wherein the known locations of the reference stations are precisely surveyed locations.
36. The local area augmentation navigation system of claim 33, wherein each of the reference stations includes an independent power supply.
37. The local area augmentation navigation system of claim 4, wherein the independent power supply is a solar power supply.
38. The local area augmentation navigation system of claim 33, wherein the local area augmentation navigation system does not require any significant power or communication infrastructure.
39. The local area augmentation navigation system of claim 33, wherein the correction message is broadcast as an omni directional data broadcast.
40. The local area augmentation navigation system of claim 33, wherein the

correction message is broadcast as a directional data broadcast.

41. The local area augmentation navigation system of claim 33, wherein the object is an airplane, and wherein the correction message includes differential pseudo-range corrections and data describing the final approach paths that are available to the pilot.
42. The local area augmentation navigation system of claim 33, further comprising an evaluation computer receiving an information signal from the security receiver and outputting an alert signal when a message is received by the security receiver which is indicative of an unauthorized broadcaster.
43. The local area augmentation system of claim 9, wherein the evaluation computer receives the correction message output by the master station and determines that an unauthorized broadcaster exists when the message received by the security receiver does not match the correction message broadcast by the master station.

44. The local area augmentation system of claim 9, wherein the evaluation computer is implemented in the security receiver.
45. The local area augmentation system of claim 9, wherein the evaluation computer is implemented in the master station.
46. The local area augmentation system of claim 9, wherein the evaluation computer is implemented in an air traffic control computer.
47. The local area augmentation system of claim 33, wherein the reference stations communicate with the master station via wireless transceivers.
48. The local area augmentation system of claim 33, wherein the communication between the reference stations and the master station is encoded.
49. A local area augmentation navigation system for determining the location of an object using differential GPS, the system comprising:

at least two reference stations at known locations, each of the reference stations receiving a GPS signal from a GPS constellation and collecting and outputting the pseudo-range data from the GPS signal;

a master station receiving the pseudo-range data from the reference stations, the master station forming a correction message from the pseudo-range data and the known locations of the reference stations, the master station broadcasting the correction message via an antenna;

a security receiver having an antenna separate from the antenna of the master station for monitoring unauthorized broadcasts in the area having a similar character as the correction message broadcast by the master station; and

a LAAS receiver receiving the correction message broadcast by the master station as well as a GPS signal from the GPS constellation and calculating the location of the LAAS receiver with the correction message and the GPS signal.

50. The local area augmentation navigation system of claim 49, wherein the master station includes a VHF transmitter and broadcasts the correction message with the VHF transmitter.

51. The local area augmentation navigation system of claim 49, wherein the known locations of the reference stations are precisely surveyed locations.
52. The local area augmentation navigation system of claim 49, wherein each of the reference stations includes an independent power supply.
53. The local area augmentation navigation system of claim 4, wherein the independent power supply is a solar power supply.
54. The local area augmentation navigation system of claim 49, wherein the local area augmentation navigation system does not require any significant power or communication infrastructure.
55. The local area augmentation navigation system of claim 49, wherein the correction message is broadcast as an omni directional data broadcast.
56. The local area augmentation navigation system of claim 49, wherein the

correction message is broadcast as a directional data broadcast.

57. The local area augmentation navigation system of claim 49, wherein the object is an airplane, and wherein the correction message includes differential pseudo-range corrections and data describing the final approach paths that are available to the pilot.
58. The local area augmentation navigation system of claim 49, further comprising an evaluation computer receiving an information signal from the security receiver and outputting an alert signal when a message is received by the security receiver which is indicative of an unauthorized broadcaster.
59. The local area augmentation system of claim 9, wherein the evaluation computer receives the correction message output by the master station and determines that an unauthorized broadcaster exists when the message received by the security receiver does not match the correction message broadcast by the master station.

60. The local area augmentation system of claim 9, wherein the evaluation computer is implemented in the security receiver.
61. The local area augmentation system of claim 9, wherein the evaluation computer is implemented in the master station.
62. The local area augmentation system of claim 9, wherein the evaluation computer is implemented in an air traffic control computer.
63. The local area augmentation system of claim 49, wherein the reference stations communicate with the master station via wireless transceivers.
64. The local area augmentation system of claim 49, wherein the communication between the reference stations and the master station is encoded.
65. A method for enhancing the security of a broadcast between a master station of a local area augmentation system and a LAAS receiver, comprising the step of:



providing a security receiver for installation remotely from the master station of the local area augmentation system to monitor unauthorized broadcasts in the area having a similar character as a correction message broadcast by the master station.

66. A method for enhancing the security of a broadcast between a master station of a local area augmentation system and a LAAS receiver, comprising the step of:

selling and distributing a security receiver to an airport for installation remotely from the master station of the local area augmentation system to monitor unauthorized broadcasts in the area having a similar character as a correction message broadcast by the master station.

67. A method for enhancing the security of a broadcast between a master station of a local area augmentation system and a LAAS receiver, comprising the step of:

installing a security receiver remotely from the master station of the local area augmentation system to monitor unauthorized broadcasts in the area having a similar character as a correction message broadcast by the master station.

68. A local area augmentation navigation system for determining the location of an object using differential GPS, the system comprising:

at least two reference stations at known locations, each of the reference stations receiving a GPS signal from a GPS constellation and collecting and outputting the pseudo-range data from the GPS signal via a wireless transceiver;

a master station receiving the pseudo-range data from the reference stations, the master station forming a correction message from the pseudo-range data and the known locations of the reference stations, the master station broadcasting the correction message via an antenna;

a LAAS receiver receiving the correction message broadcast by the master station as well as a GPS signal from the GPS constellation and calculating the location of the LAAS receiver with the correction message and the GPS signal.

69. A local area augmentation navigation system for determining the location of an object using differential GPS, the system comprising:

at least two reference stations at known locations, each of the reference

stations receiving a GPS signal from a GPS constellation and collecting and outputting the pseudo-range data from the GPS signal, each of the reference stations having an independent, alternate energy power supply;

a master station receiving the pseudo-range data from the reference stations, the master station forming a correction message from the pseudo-range data and the known locations of the reference stations, the master station broadcasting the correction message via an antenna;

a LAAS receiver receiving the correction message broadcast by the master station as well as a GPS signal from the GPS constellation and calculating the location of the LAAS receiver with the correction message and the GPS signal.

70. The local area augmentation navigation system of claim 69, wherein the alternate energy power supply includes a solar panel.

71. A method for enhancing the security of a broadcast between a master station of a local area augmentation system and a LAAS receiver, comprising the step of:

monitoring the broadcast between the master station of the local area augmentation system and the LAAS receiver for unauthorized broadcasts in the area having a similar character as a correction message broadcast by the master station; and

outputting an alert signal upon detection of an unauthorized broadcast.

72. In an airport navigation system, a method for enhancing the security of a broadcast between a master station of the airport navigation system and a LAAS receiver, comprising the step of:

monitoring the broadcast between the master station of the local area augmentation system and the LAAS receiver for unauthorized broadcasts in the area having a similar character as a correction message broadcast by the master station; and

outputting an alert signal upon detection of an unauthorized broadcast.